THE ECONOMICS OF **SUGAR BEET** PRODUCTION

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THE ECONOMICS OF SUGAR BEET PRODUCTION IN ALBERTA 1998

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G. Nabi Chaudhary

Alberta Sugar Beet Growers

CONGRATULATIONS ON YOUR

75TH ANNIVERSARY

Wishing you continued
success, growth and prosperity
in the New Millennium!

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SECTION I

INTRODUCTION

Sugar beets grows best in rich, deep soil in temperate climates. Sugar beet production is well suited for the irrigated land in Southern Alberta. Sugar beets are a rotation crop, planted once every four years to minimize potential disease problems. Sugar beet seeding begins in early spring and continues from mid- April to the end of May. Sugar beets are land and labour intensive and are grown with supplementary irrigation.

Alberta Agriculture, Food and Rural Development (AAFRD) has been monitoring the costs and returns of livestock and crop production in the province in an extensive way since the 1960's. These studies have been viewed as an important tool for assisting producers in their cropping decisions as well as for developing policies and programs for the different farm enterprises in the province and Canada. Where information gaps existed in other provinces, results from these studies have served as the basis to fill those gaps.

Sugar beet production costs and returns in Alberta have been monitored since the early 1970's. The 1998 cost and return study is a continuing effort to monitor changes in the sugar beet industry in the province. This year's information, like previous years, would be used for several purposes including policy and program development for the sugar beet industry.

Objectives:

Major objectives of the study are:

i. To develop production costs and returns for sugar beet production in Alberta.

ii. To assist sugar beet growers with farm budgeting and planning.

iii. To analyze economies of scale, machine use and input/output relationships for sugar beet production.

iv. To provide each study participant with an individual farm analysis along with group averages.

v. To provide an annual update for policy and program development and for extension personnel.

Study Sample

The sample for the 1998 study was originally selected from a list of producers who held sugar beet contracts. The random selection of the sample ensured a representative cross section of producers in the province. A total of 35 producers were selected to be surveyed personally to obtain detailed cost and return information. However, due to early spring and other time constraints only 31 sugar beet producers could be surveyed for the 1998 crop. These thirty one (31) producers provided data on 53 fields (owned and rented) as each field was recorded separately. The fifty two (53) fields represent about twelve (12) percent of the total area planted to sugar beets in 1998.

SECTION II

METHOD OF ANALYSIS

The raw data obtained from the 31 sugar beet producers was reviewed for any information gaps before entering into computer for analysis. In the past years, a mainframe computer program was used to analyze both the individual farm reports as well as computing group averages. However, for the 1998 crop year, Paradox 7 Program (micro computer database) was used to analyze the data. This program allows changes and updates in many of the cost allocations.

Fuel, Repairs and Machine Investment Allocations

Farm records are usually kept on a whole farm basis. Many input costs are separable by enterprise type since crop management requires it (fertilizer and chemical use for example). Records on other important costs such as fuel and repairs are not usually kept on an enterprise level. The participating producers were asked for feedback to see if cost allocations have been reasonable for their operation. The cost of production studies undertaken by the Economics and Competitiveness Division have attempted to allocate costs on a crop by crop basis where farm records alone were insufficient. Sugar beet production requires intensive use of fertilizer, chemicals, fuel and equipment. Proper allocation of these factors of production is important if results are to be used with confidence.

Machine investment was allocated by the study participants (beet producers) with the surveyor. Specialized sugar beet equipment was allocated 100 percent to the sugar beet enterprise. Other machinery which was used on both conventional crops as well as sugar beet land was allocated based on relative use. An engineering model was developed to study the time spent with various machines on a per acre basis[1]. These results were used to allocate machine investment between various enterprises on the farm (ie: grain vs sugar beet production).

[1]Prior to 1990 repair costs to sugar beet equipment were allocated 100% to the sugar beet enterprise and repair costs to all other machinery were allocated based on machine investment. However for 1996, repair costs were allocated according to machine use which was based on an engineering model.

Fuel use is another factor of production which must be allocated within the computer program since most producers do not keep separate records on a field by field basis. Results from the engineering model indicated that sugar beet production on average uses approximately 2.9 times the amount of fuel as compared to a conventional grain crop grown on irrigation[2].

[2]Results of the model also showed that fuel use on conventional crop production under irrigation uses 1.7 times the amount of fuel used for dryland crop production. Earlier studies allocated fuel costs based only on machine investment by enterprise.

SECTION III

SUGAR BEET PRODUCTION IN ALBERTA, 1980-1999

During the last 20 years, contracted area under sugar beets in Alberta has fluctuated considerably. As a result of contractual difficulties there were no sugar beets grown in 1985. Table 1 presents an historical account of sugar beet production in Alberta from 1980 to 1999.

During the last two decades, contracted area for sugar beet production has ranged from a low of 29,575 acres in 1988 to 45,000 acres in 1999. In 1997, area contracted for sugar beets was 33,467 acres, about 1.7 percent lower than in 1996. However, in 1998 contracted area for sugar beet production increased by almost 25 percent over in 1997 to 41,742 acres due to the expansion of the Sugar Factory. In 1999, area contracted for sugar beets production increased by about eight (8) percent to 45,000 acres over in 1998. From 1990 to 1997, area contracted for sugar beet production has ranged from 32,148 in 1992 to 35,399 acres in 1994. In 1997, almost all of the contracted acres were harvested compared to 97 percent of the crop harvested in 1992. Like the previous three years beet crops (1994, 1995 and 1996), over 99 percent of the planted acres were harvested in 1997 as well. In 1998, sugar beet area harvested was 98.5 percent of the area contracted, a very small decrease compared to the previous year.

Sugar beet tonnage during the last 19 years, i.e., from 1980 to 1998, has ranged from a low of 474 866 tonnes in 1982 to 959 310 tonnes in 1998. Fluctuation in sugar beet tonnage has been the direct result of acres harvested and yield per acre. For the 1998 sugar beets crop, tonnage harvested was at 959 310, the highest during the last 19 years. The sudden increase in sugar beet tonnage of 47.5 percent in 1998 was the result of over 24 percent increase in area harvested and about 18 percent increase in yield compared to 1997. The 1998 sugar beet production recorded the highest yield ever of 23.32 tonnes. With increase in acres harvested and record yield, overall sugar beet production increased by more than 308 880 tonnes, an increase of 47.5 percent over in 1997. In 1999, although area harvested for beets had increased by eight (8) percent yet the overall production decreased by 12.5 percent to 839 700 tonnes from 1998. Average yield for the 1999 beet crop was estimated at 18.92 tonnes per acre, a decrease of almost 19 percent from the record yield in 1998.

Average yield for the 31 sugar beets study participants was 24.67 tonnes per acre in 1998 compared with 23.32 tonnes per acre for the industry. As mentioned above, the average yield for the 1998 sugar beet crop was the highest at 23.32 tonnes per acre during the last 19 years. It surpassed the previous record of 22.92 tonnes per acre set in 1986.

Yield per acre has also shown considerable variation from 1980 to 1998. It has ranged from 15.52 tonnes per acre in 1980 to over 23 tonnes per acre in 1998. Average yield per acre of 23.32 tonnes for the 1998 sugar beet crop was higher by over 18 percent from a year earlier, i.e., 19.71 tonnes in 1997.

Beet prices have also fluctuated quite dramatically over the same period of time. Prices have ranged from about $31 per tonne in 1986 to $67 per tonne in 1980, a 116 percent difference[3]. For the 1998 crop, price per tonne of sugar beets decreased by 30 percent to $33.82 from $48.30 per tonne in 1997. The 1998 sugar beets price was the second lowest after the 1984 price of $31.49 per tonne.

Details of sugar beet production in Alberta, contracted, planted and harvested acres, yield per acre and dollars per tonne received by beet producers from 1980 to 1998, are presented in Table 1 on the next page.

[3]All prices reported are in nominal dollars. In other words, these were the actual prices received by the producers.

TABLE 1
SUGAR BEET PRODUCTION IN ALBERTA, 1980-1999

Year	Acres Contracted	Acres Planted	Acres Harvested	Tonnage Harvested	Yield per Acre Tonnes	Dollars per Tonne
1980	35,609	34,850	33,771	524,251	15.52	66.99
1981	35,405	35,139	35,071	715,082	20.39	47.87*
1982	32,161	31,833	30,502	474,866	15.57	55.59*
1983	32,354	31,883	31,563	569,846	18.05	38.76
1984	32,075	31,559	28,830	513,180	17.80	31.49
1985	- - - no sugar beet production - - -					
1986	30,054	29,711	28,493	596,122	22.92	39.25*
1987	29,983	29,438	29,169	564,814	19.36	45.26*
1988	29,575	28,945	28,109	540,405	19.22	41.16*
1989	30,619	29,632	29,483	499,061	16.93	45.19
1990	33,299	32,875	32,664	590,303	18.07	42.28*
1991	33,260	33,013	32,779	634,949	19.37	34.38*
1992	32,148	31,351	31,127	475,823	15.29	38.19
1993	33,088	32,504	32,432	542,253	16.72	41.99*
1994	35,399	34,944	34,836	737,774	21.25	43.16*
1995	34,506	33,913	33,656	688,498	20.46	43.70
1996	34,043	33,784	33,463	676,611	20.22	42.13
1997	33,467	33,327	33,126	650,423	19.71	48.30
1998	41,742	41,250	41,132	959,310	23.32	33.82
1999	45,000	44,588	44,387	839,700	18.92	N/A

Source: Sugar Beet Growers' of Alberta, 75th. Annual Report, Taber, Alberta.
(*) Price includes payments under the stabilization and tripartite programs.

SECTION IV

SUGAR BEET PRODUCTION COSTS AND RETURNS, 1998

The 1998 sugar beet study sample comprised of 31 sugar beet producers (53 fields) who provided detailed information on their operations. The study sample of 31 beet producers was divided into two groups to develop production costs and returns for beets grown on owned and rented land.

a) Gross Returns

Table 2 presents production costs and returns for the entire study sample of 31 sugar beet producers (53 fields). Average yield reported by the study participants in 1998 was 24.67 tonnes per acre with an average area of about 98 acres of beets per farm. With a final price of $33.82 per tonne, average value of production was $834 per acre. When miscellaneous receipts (crop insurance, rebates, patronage, and custom work and other government program payments) were included, average gross revenue per acre increased to $848 per acre or $34.39 per tonne. A detailed breakdown of gross returns is given in Section A of Table 2.

b) Variable Costs

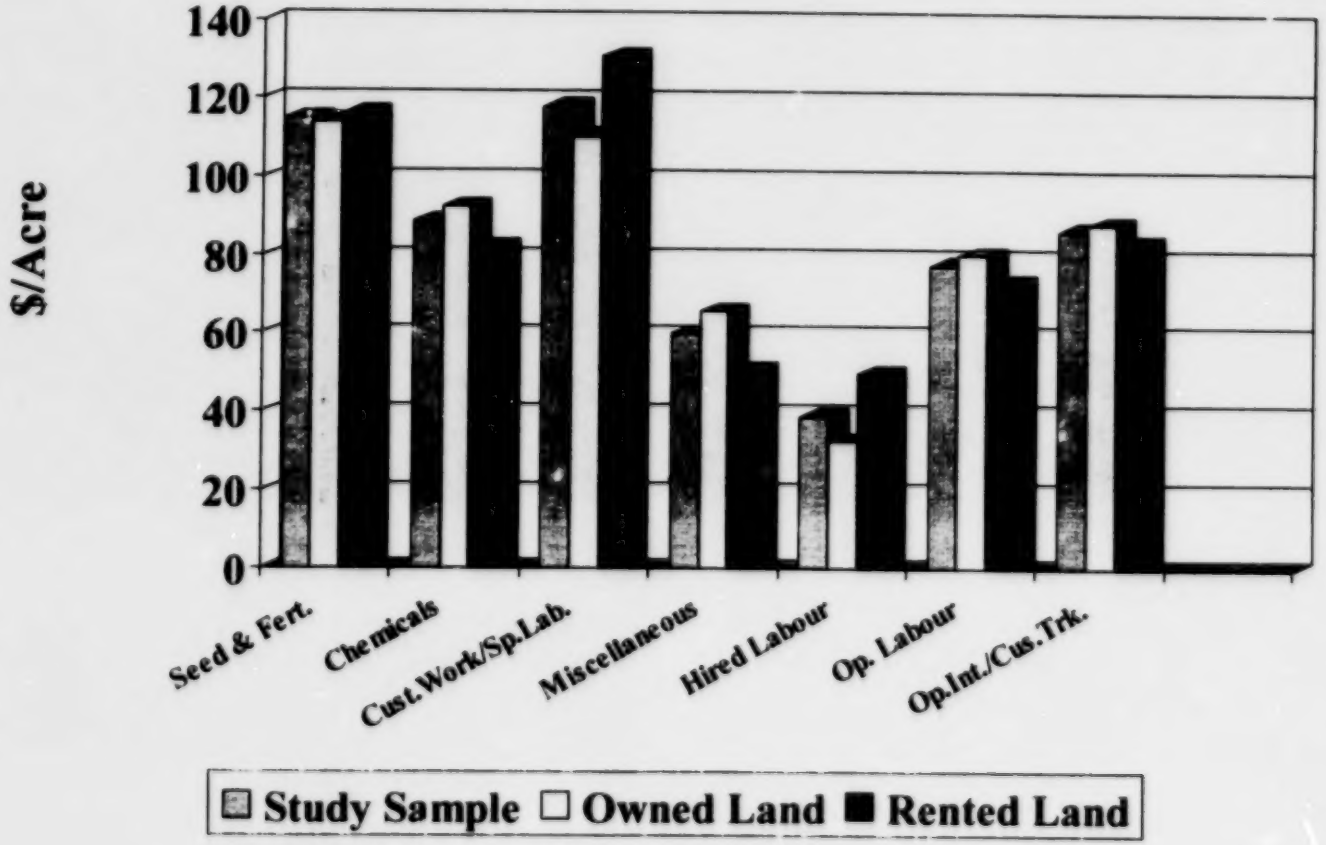
Detailed breakdown of various input costs is presented in Table 2. All of the costs are weighted averages and are expressed on a per acre and per tonne basis. Input costs (seed, fertilizer and chemicals) amounted to $204 per acre or $8 per tonne. Average trucking/marketing costs, fuel, repair costs (machinery and buildings) and utilities were $234 per acre ($9.49 per tonne) for the 1998 sugar beets crop.

Three of the other most significant cost items for the 1998 sugar beet crop were unpaid family and operator labour, custom work and specialized labour and paid labour which accounted for $148 per acre or 24 percent of total variable costs. Unpaid family and operator labour amounted to $78 per acre ($3.16 per tonne). Figure 1 shows a graphical presentation of variable costs for the study sample (31 sugar beet producers) on a per acre basis for the 1998 sugar beet crop.

Table 2: Sugar Beet Production Costs and Returns, 1998 (53 Enterprises)		
Acres Cropped 97.71 Yield Per Acre 24.67 tonnes	$ per acre	$ per tonne
GROSS RETURNS		
Crop Sales	834.20	33.82
Crop Insurance Receipts	7.61	
Miscellaneous Receipts	6.47	
A. TOTAL GROSS RETURNS	**848.29**	**34.39**
VARIABLE COSTS		
Seed	58.34	
Fertilizer (Net of Rebate)	56.65	
Chemicals	88.61	
Hail/Crop Insurance	7.56	
Machine Fuel (Net of Rebate)	36.71	
Irrigation Fuel	19.57	
Repairs - Machinery	59.08	
Repairs - Buildings	2.73	
Utilities, Insurance & Overhead	37.63	
Association Fees & Research Levies	15.05	
Custom Work and Specialized Labour	31.14	
Trucking and Marketing	78.34	
Operating Interest Paid	8.24	
Paid Labour	38.80	
Unpaid Family & Operator Labour	77.74	
B. TOTAL VARIABLE COSTS	**616.19**	**24.98**
C. DIRECT CASH COSTS (Total Variable Costs - Unpaid Labour)	**538.45**	**21.83**
CAPITAL COSTS		
Cash Rent/Crop Share	50.10	
Taxes, Water Rates & Insurance	28.18	
Equipment/Building Depreciation	117.50	
Paid Capital Interest	28.57	
D. TOTAL CAPITAL COSTS	**224.35**	**9.10**
E. TOTAL PRODUCTION COSTS (B+D)	**840.54**	**34.08**
F. NET RETURNS		
Return to Capital (A-B)	232.10	9.41
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	85.49	3.47
Return to Investment (A-E + Paid Capital Interest)	36.32	1.47
Return to Equity (A-E)	7.75	0.31
INVESTMENT		
Land & Buildings	1238.26	
Machinery	1116.57	

Source: Economics Unit, Alberta Agriculture, Food and Rural Development, Edmonton, Alberta.

Figure 1
Variable Cost Breakdown for Sugar Beets, 1998



c) Cash Costs

For the purposes of this study direct cash costs do not include expenses associated with unpaid family and management labour. Direct cash costs for the study sample of 31 beet producers for the 1998 crop amounted to $538 per acre or $22 per tonne (Table 2). However, total variable costs including unpaid family and operator labour were $616 per acre ($25 per tonne).

Cash costs for sugar beets grown on owned and rented land (Tables 3 & 4) were $532 ($21 per tonne) and $549 ($23 per tonne), respectively. Total variable costs for beets produces on owned land were $612 per acre ($24 per tonne) compared with $623 per acre ($26 per acre) for beets produced on rented land.

d) Capital Costs

Capital costs are "fixed" overhead costs which are incurred regardless of the size of enterprise or the output on a per acre basis of the enterprise. These are cash (cash rent, crop share, taxes, water rates, insurance, paid capital interest) and non-cash capital costs (depreciation).

Capital costs for the study sample amounted to $224 per acre ($9 per tonne) for the 1998 beet crop. These were almost 27 percent of total costs of sugar beet production in 1998. Capital costs were 26 percent (Table 3) of total costs for sugar beets produced on owned land compared to 28 percent (Table 4) for beets produced on rented land.

Rental agreements generally include land rental, irrigation equipment and the sugar beet contract. Some producers rent land and irrigation equipment only. Average rental rate (a combination of the rental arrangements described above) for the 1998 crop was $136 per acre ($5.77 per tonne) for the 22 fields used to grow sugar beets on rented land (Table 4). This represents about 16 percent of total production costs for these producers.

Taxes, water rates and insurance for the study participants for the 1998 beet crop were estimated at $28 per acre or about $1.14 per tonne in 1998. These were about $38 per acre ($1.51 per tonne) for beets grown on owned land versus $12 per acre ($0.51 per tonne) for beets grown on rented land.

Equipment and building depreciation was calculated for specialized sugar beet equipment while other equipment was allocated and pro-rated based on use between sugar beets and the remaining farm enterprises. Equipment depreciation was calculated based on the current value of machinery. These costs (equipment and building depreciation) were significant for a sugar beet enterprise, amounting to $117 per acre ($4.74 per tonne) for the study sample. For beets produced on owned land, depreciation costs were $137 per acre (Table 3) compared to about $84 per acre (Table 4) for beets produced on rented land. Figure 2 shows the relative proportions of all costs for sugar beet production in 1998 for the 31 sugar beet producers with 53 fields.

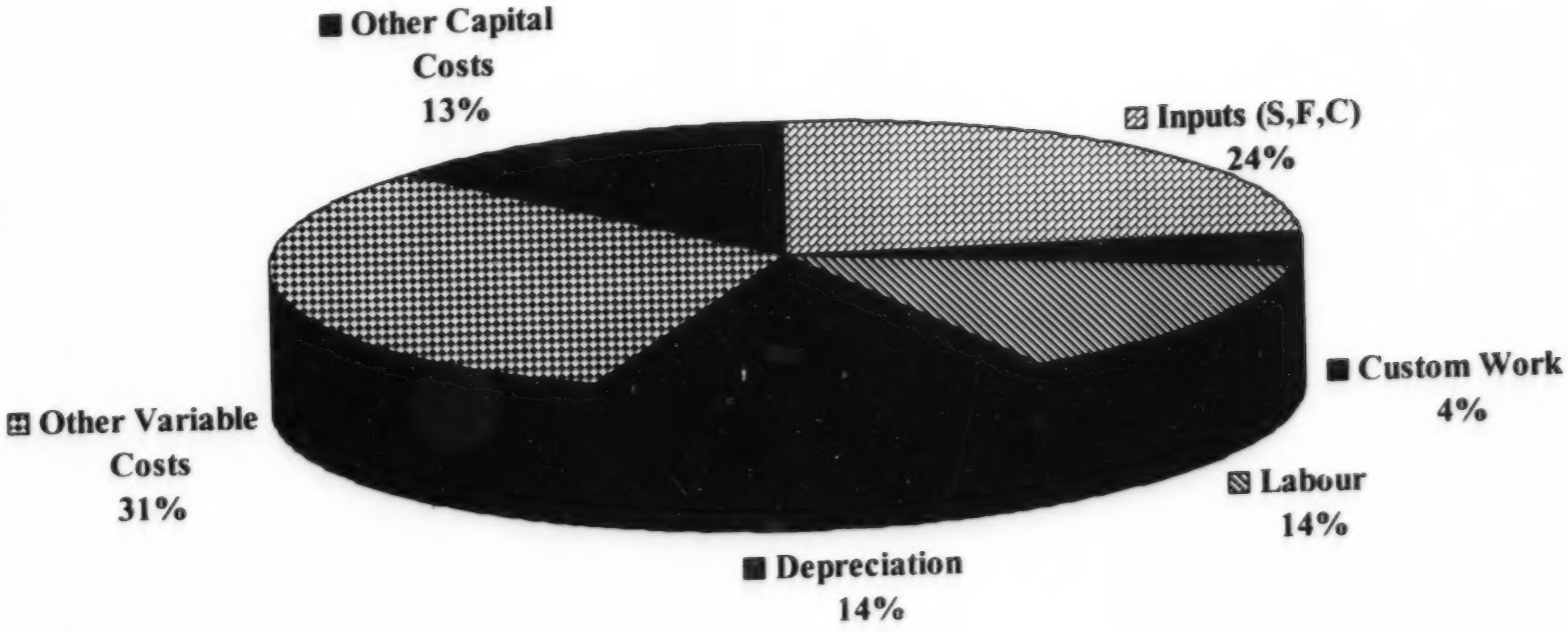
Table 3: Sugar Beet Costs and Returns, Owned Land, 1998 (31 Enterprises)			
Acres Cropped Yield Per Acre	105.37 25.24 tonnes	$ per acre	$ per tonne
GROSS RETURNS			
Crop Sales		853.58	33.82
Crop Insurance Receipts		10.04	
Miscellaneous Receipts		6.20	
A. TOTAL GROSS RETURNS		**869.82**	**34.46**
VARIABLE COSTS			
Seed		58.34	
Fertilizer (Net of Rebate)		56.01	
Chemicals		92.40	
Hail/Crop Insurance		8.17	
Machine Fuel (Net of Rebate)		34.16	
Irrigation Fuel		19.21	
Repairs - Machinery		54.51	
Repairs - Buildings		2.70	
Utilities, Insurance & Overhead		42.15	
Association Fees & Research Levies		15.40	
Custom Work & Specialized Labour		28.32	
Trucking and Marketing		80.49	
Operating Interest Paid		7.93	
Paid Labour		32.27	
Unpaid Family & Operator Labour		80.26	
B. TOTAL VARIABLE COSTS		**612.31**	**24.26**
C. DIRECT CASH COSTS (Total Variable Costs - Unpaid Labour)		**532.05**	**21.08**
CAPITAL COSTS			
Cash Rent/Crop Share		0.00	
Taxes, Water Rates & Insurance		37.74	
Equipment/Building Depreciation		136.85	
Paid Capital Interest		38.64	
D. TOTAL CAPITAL COSTS		**213.23**	**8.45**
E. TOTAL PRODUCTION COSTS (B+D)		**825.54**	**32.71**
F. NET RETURNS			
Return to Capital (A-B)		257.51	10.20
Return to Unpaid Labour (A-E + Unpaid Operator Labour)		124.54	4.93
Return to Investment (A-E + Paid Capital Interest)		82.92	3.29
Return to Equity (A-E)		44.28	1.75
INVESTMENT			
Land & Buildings		1881.40	
Machinery		1324.35	

Source: Economics Unit, Alberta Agriculture, Food and Rural Development, Edmonton, Alberta.

Table 4: Sugar Beet Costs and Returns, Rented Land, 1998 (22 Enterprises)			
Acres Cropped Yield Per Acre	86.91 23.69 tonnes	$ per acre	$ per tonne
GROSS RETURNS			
Crop Sales		801.10	33.82
Crop Insurance Receipts		3.48	
Miscellaneous Receipts		6.95	
A. TOTAL GROSS RETURNS		**811.52**	**34.26**
VARIABLE COSTS			
Seed		58.34	
Fertilizer (Net of Rebate)		57.76	
Chemicals		82.14	
Hail/Crop Insurance		6.51	
Machine Fuel (Net of Rebate)		41.06	
Irrigation Fuel		20.20	
Repairs - Machinery		66.88	
Repairs - Buildings		2.80	
Utilities, Insurance & Overhead		29.90	
Association Fees & Research Levies		14.45	
Custom Work & Specialized Labour		35.95	
Trucking and Marketing		74.67	
Operating Interest Paid		8.75	
Paid Labour		49.94	
Unpaid Family & Operator Labour		73.43	
B. TOTAL VARIABLE COSTS		**622.77**	**26.29**
C. DIRECT CASH COSTS (Total Variable Costs - Unpaid Labour)		**549.34**	**23.19**
CAPITAL COSTS			
Cash Rent/Crop Share		135.68	
Taxes, Water Rates& Insurance		11.85	
Equipment/Building Depreciation		84.42	
Paid Capital Interest		11.41	
D. TOTAL CAPITAL COSTS		**243.37**	**10.27**
E. TOTAL PRODUCTION COSTS (B+D)		**866.14**	**36.57**
F. NET RETURNS			
Return to Capital (A-B)		188.75	7.97
Return to Unpaid Labour (A-E + Unpaid Operator Labour)		18.81	0.79
Return to Investment (A-E + Paid Capital Interest)		(43.21)	1.82
Return to Equity (A-E)		(54.62)	(2.31)
INVESTMENT			
Land & Buildings		1139.53	
Machinery		761.60	

Source: Economics Unit, Alberta Agriculture, Food and Rural Development, Edmonton, Alberta.

Figure 2
Breakdown of Total Costs for Sugar Beet Production, 1998



e) Total Production Costs

Total production costs for sugar beet production for the study sample of 31 producers (average of all 53 fields) were estimated at $841 per acre ($34 per tonne) in 1998. Of this, 64 percent were direct cash costs, almost 27 percent capital costs and the remaining 9 percent for unpaid operator labour (Table 2). Tables 3 and 4 present total production costs for beets produced on owned and rented land, respectively.

f) Net Returns

Section (F) of Tables 2, 3 and 4 presents returns to capital; unpaid labour; investment; and equity for the study sample, beets grown on owned and rented land, respectively. The following procedures were used to calculate net returns:

Return to Capital:

Also known as gross margin is the difference between gross returns less variable costs. This is the amount of money left to pay for overhead costs (land rental, taxes and insurance), depreciation and capital interest and management. Average return to capital was $232 per acre ($9 per tonne) for the entire study sample of 31 beet producers. It was $258 per acre ($10 per tonne) for beet produced on owned land and $189 per acre ($8 per tonne) on rented land.

Return to Unpaid Labour:

Return to unpaid labour is gross returns less total production costs other than costs imputed for unpaid family and operator labour. Return to unpaid labour for the study sample was $85 per acre or $3 per tonne. These results are presented in Tables 2, 3 and 4.

Return to Investment:

Return to investment reflects the dollar or percent return to the total value of assets. This represents gross return less total production costs with the exception of interest payments on capital spending. Return to investment for sugar beet production for the study sample was $36 per acre or $1.47 per tonne in 1998 (Table 2). It was $83 per acre for beets produced on owned land (Table 3). Return to investment was negative by $43 per care ($1.82 per tonne) for beets produced on rented land (Table 4).

Return to Equity:

Return to equity is gross returns less total production costs (including all capital costs). The amount of money left to pay for unpaid family labour and management was positive at $8 per acre or $0.31 per tonne for the study sample of 31 beet producers with 53 fields (Table 2). It was $44 per acre ($1.75 per tonne) for beets produced on owned land (31 fields, Table 3). Return to equity was negative by $55 per care or $2.31 per tonne for beets produced on rented land (Table 4).

SECTION V

SUGAR BEET PRODUCTION COSTS AND RETURNS BY THE SIZE OF OPERATION, 1998

The study sample of 31 beet producers (53 fields) was divided into three groups by size of field. Main objective of analysing the data by size of field was to study the economies of scale, i.e., whether the size of field had any effect on net returns and overall sugar beet production costs. Following are the three groups by size of fields:

Group I	Up to 50 Acres
Group II	51 to 100 Acres
Group III	Over 100 Acres

Group I (Up to 50 Acres):

Table 5 presents production costs and returns for sugar beet producers in Group I. Number of sugar beet fields in Group I was 17 with an average size of 37.13 acres or 12 per cent of the area surveyed for the 1998 study. Average yield for this group of beet producers was 22.68 tonnes per acre which was lower compared to other two Groups II & III. Similarly, gross revenue for Group I participants was also lower at $778 or $34.29 per tonne. This Group of producers had the highest capital costs at $271 per acre compared to other two Groups. Total production costs for study participants in this Group amounted to $877 per acre or $38.67 per tonne. Net returns to capital and unpaid labour were positive at $285 per acre ($12.55 per tonne) and $ 13 per acre ($0.59 per tonne), respectively. Detailed breakdown of gross returns, variable costs, capital costs, total production costs and net returns are presented in Table 5.

Group II (50 to 100 Acres):

Results for Group II beet participants are presented in Table 6. There were 21 beet fields in the range of 50 to 100 acres with an average field size of 74.59 acres. This Group represented almost 33 per cent of the sugar beet area surveyed for the 1998 crop. Average yield per acre for this group was 23.92 tonnes , marginally higher than the industry average of 23.32 tonnes. Average gross revenue for participants in Group II amounted to $823 per

Table 5: Sugar Beet Costs and Returns by Size of Field (Up to 50 Acres), 1998 (17 Enterprises)			
Acres Cropped	37.13	$ per acre	$ per tonne
Yield Per Acre	22.68 tonnes		
GROSS RETURNS			
Crop Sales		767.04	33.82
Crop Insurance Receipts		8.71	
Miscellaneous Receipts		2.04	
A. TOTAL GROSS RETURNS		**777.78**	**34.29**
VARIABLE COSTS			
Seed		58.34	
Fertilizer (Net of Rebate)		48.80	
Chemicals		90.41	
Hail/Crop Insurance		7.02	
Machine Fuel (Net of Rebate)		42.22	
Irrigation Fuel		20.81	
Repairs - Machinery		55.67	
Repairs - Buildings		2.46	
Utilities, Insurance & Overhead		29.28	
Association Fees & Research Levies		13.84	
Custom Work & Specialized Labour		44.19	
Trucking and Marketing		49.46	
Operating Interest Paid		6.83	
Paid Labour		23.74	
Unpaid Family & Operator Labour		112.73	
B. TOTAL VARIABLE COSTS		**605.80**	**26.71**
C. DIRECT CASH COSTS (Total Variable Costs - Unpaid Labour)		**493.07**	**21.74**
CAPITAL COSTS			
Cash Rent/Crop Share		84.84	
Taxes, Water Rates& Insurance		27.96	
Equipment/Building Depreciation		141.26	
Paid Capital Interest		27.17	
D. TOTAL CAPITAL COSTS		**271.23**	**11.96**
E. TOTAL PRODUCTION COSTS (B+D)		**877.04**	**38.67**
F. NET RETURNS			
Return to Capital (A-B)		284.71	12.55
Return to Unpaid Labour (A-E + Unpaid Operator Labour)		13.48	0.59
Return to Investment (A-E + Paid Capital Interest)		72.08	3.18
Return to Equity (A-E)		(99.25)	4.38
INVESTMENT			
Land & Buildings		1111.12	
Machinery		1121.46	

Source: Economics Unit, Alberta Agriculture, Food and Rural Development, Edmonton, Alberta.

Table 6: Sugar Beet Costs and Returns by Size of Field (50 to 100 Acres), 1998 (21 Enterprises)			
Acres Cropped	74.59	$ per acre	$ per tonne
Yield Per Acre	23.92 tonnes		
GROSS RETURNS			
Crop Sales		809.05	33.82
Crop Insurance Receipts		5.52	
Miscellaneous Receipts		2.05	
A. TOTAL GROSS RETURNS		**823.12**	**34.41**
VARIABLE COSTS			
Seed		58.34	
Fertilizer (Net of Rebate)		51.25	
Chemicals		94.34	
Hail/Crop Insurance		9.13	
Machine Fuel (Net of Rebate)		39.41	
Irrigation Fuel		22.20	
Repairs - Machinery		64.50	
Repairs - Buildings		3.97	
Utilities, Insurance & Overhead		32.65	
Association Fees & Research Levies		14.59	
Custom Work & Specialized Labour		15.20	
Trucking and Marketing		70.19	
Operating Interest Paid		14.05	
Paid Labour		30.33	
Unpaid Family & Operator Labour		86.09	
B. TOTAL VARIABLE COSTS		**606.25**	**25.34**
C. DIRECT CASH COSTS (Total Variable Costs - Unpaid Labour)		**520.16**	**21.75**
CAPITAL COSTS			
Cash Rent/Crop Share		56.36	
Taxes, Water Rates& Insurance		25.55	
Equipment/Building Depreciation		126.54	
Paid Capital Interest		34.84	
D. TOTAL CAPITAL COSTS		**243.28**	**10.17**
E. TOTAL PRODUCTION COSTS (B+D)		**849.53**	**35.51**
F. NET RETURNS			
Return to Capital (A-B)		216.87	9.07
Return to Unpaid Labour (A-E + Unpaid Operator Labour)		59.67	2.49
Return to Investment (A-E + Paid Capital Interest)		8.42	0.35
Return to Equity (A-E)		(26.42)	(1.10)
INVESTMENT			
Land & Buildings		1273.83	
Machinery		1205.89	

Source: Economics Unit, Alberta Agriculture, Food and Rural Development, Edmonton, Alberta.

acre or $34.41 per tonne. Variable costs were estimated at $606 per acre ($25.34 per tonne). Capital costs for this group were $243 per acre ($10.17 per tonne). Average total production costs for 21 sugar beet fields were $849.53 per acre or $35.51 per tonne. Net returns to capital, unpaid labour and investment were positive. However, net return to equity was negative at $26.42 per acre or $1.10 per tonne (Table 6).

Group III (Over 100 Acres):

Average area per farm for Group III study participants was 179.71 acres. This group of beet producers had 15 beet fields in 1998. Average yield per acre was the highest at 25.41 tonnes per care compared to the above two groups. Similarly, gross revenue for Group III beet producers was also higher at $874 per acre ($34.40 per tonne). Variable costs were calculated at $623 per acre or $24.52 per tonne. Capital costs for this group were lower compared to the other two groups. However, variable costs were more than the smaller two groups. Total production costs for these participants were $829 per acre ($32.64 per tonne), significantly lower than Group I participants (up to 50 acres) and somewhat lower than Group II (50 to 100 acres). Net returns to capital, unpaid labour, investment and equity were all positive for this Group. Detailed breakdown on gross revenue, variable and capital costs and net returns are given in Table 7.

Table 7: Sugar Beet Costs and Returns by Size of Field (Over 100 Acres), 1998 (15 Enterprises)			
Acres Cropped	179.71	$ per acre	$ per tonne
Yield Per Acre	25.41 tonnes		
GROSS RETURNS			
Crop Sales		859.34	33.82
Crop Insurance Receipts		7.99	
Miscellaneous Receipts		6.73	
A. TOTAL GROSS RETURNS		**874.06**	**34.40**
VARIABLE COSTS			
Seed		58.34	
Fertilizer (Net of Rebate)		60.84	
Chemicals		85.34	
Hail/Crop Insurance		6.86	
Machine Fuel (Net of Rebate)		34.31	
Irrigation Fuel		18.00	
Repairs - Machinery		56.92	
Repairs - Buildings		2.15	
Utilities, Insurance & Overhead		41.71	
Association Fees & Research Levies		15.50	
Custom Work & Specialized Labour		36.93	
Trucking and Marketing		87.79	
Operating Interest Paid		5.51	
Paid Labour		45.88	
Unpaid Family & Operator Labour		67.08	
B. TOTAL VARIABLE COSTS		**623.15**	**24.52**
C. DIRECT CASH COSTS (Total Variable Costs - Unpaid Labour)		**556.07**	**21.88**
CAPITAL COSTS			
Cash Rent/Crop Share		40.55	
Taxes, Water Rates& Insurance		29.57	
Equipment/Building Depreciation		110.34	
Paid Capital Interest		25.64	
D. TOTAL CAPITAL COSTS		**206.10**	**8.11**
E. TOTAL PRODUCTION COSTS (B+D)		**829.26**	**32.64**
F. NET RETURNS			
Return to Capital (A-B)		250.91	9.87
Return to Unpaid Labour (A-E + Unpaid Operator Labour)		111.87	4.40
Return to Investment (A-E + Paid Capital Interest)		70.44	2.77
Return to Equity (A-E)		44.80	1.76
INVESTMENT			
Land & Buildings		1243.19	
Machinery		1069.88	

Source: Economics Unit, Alberta Agriculture, Food and Rural Development, Edmonton, Alberta.

Management Profile

Sugar beet production is an intensive farming operation and requires higher degree of management skills. The 1998 study sample of 31 beet growers (53 fields) was divided into two groups (small 1/3 and large 1/3) to examine management factors.

Overall level of management was determined by the following four factors:

1. Yield
2. Variable Costs
3. Gross Margin
4. Return to Equity

Each of these factors was rated 1 to 3 for the small, middle and large 1/3 producers, respectively. However, information presented in Table 8 is only for the small 1/3 and the large 1/3 sugar beet producers. Each producer was given an average rating for the above four factors. From these averages, the large 1/3 producers in all four factors were rated 3 and the small 1/3 were rated 1. The last column in Table 8 shows a blend of 1 to 3 for each factor, depending on whether that group had more top managers (closer to 3) or not.

As mentioned above, several conclusions can be drawn from the results presented in Table 8. Total sugar beet production costs for the large 1/3 group of producers were $980.83 per acre compared with $721.66 for the small 1/3 group. Gross margin for the large 1/3 group was $337 per acre. However, return to equity for the small 1/3 group was negative at $1.35 per acre. Return to equity for the large 1/3 group was 115 per acre compared to negative $187 per acre for the small 1/3 group. Higher management rating is associated with high gross margin and return to equity.

Table 8 provides a cross-section of management factors. For each factor, estimates for the small 1/3 group are presented in the first line and estimates for the large 1/3 group in the second line. For example, in 1998 return to equity for the small 1/3 group of beet producers was negative at $126 per care compared to a positive return to equity of $205 per acre for the large 1/3 group. Yield per acre was higher by more than eight tonnes for the large 1/3 group over the small 1/3 group. Gross margin for the large 1/3 group as mentioned above was $337 per acre compared to negative gross margin of the small 1/3 producers. Overall management rating between the two groups was significantly apart, i.e. 3 versus 1 (large versus small).

TABLE 8: PROFILE OF MANAGEMENT FACTORS FOR SUGAR BEET PRODUCTION, 1998

PROFILE OF MANAGEMENT FACTORS FOR SMALL 1/3 AND LARGE 1/3 GROUPS OF SUGAR BEET PRODUCERS

			Special	Unpaid	Variable	Total	Gross	Return to	Investment				Overall
	Acres	Yield	Custom	Labour	Costs	Costs	Margin	Equity	Land	Buildings	Machine	Irrigation	Mangt.
Acres	38.28	21.50	39.43	103.41	642.74	863.23	94.29	-126.20	933.33	157.80	843.62	338.40	1.78
	175.28	25.63	31.92	68.53	665.89	840.47	214.04	39.46	958.00	164.05	810.20	265.84	2.28
Yield	66.56	19.11	15.54	90.65	595.02	795.95	59.94	-140.99	983.33	132.71	824.74	283.68	1.44
(Tonne/Acre)	115.58	27.52	25.49	91.34	683.54	889.31	256.48	50.71	1269.11	145.77	831.11	343.23	2.33
Special Custom	79.61	22.63	0.12	95.93	601.62	806.25	178.74	-25.89	1311.11	129.61	737.06	378.56	2.22
($/Acre)	119.36	24.98	77.36	91.83	716.43	914.16	134.73	-63.00	1013.56	176.90	871.57	207.84	1.72
Unpaid Labour	131.44	22.96	22.95	46.03	622.10	778.25	165.04	8.88	847.22	164.00	772.88	346.91	2.06
($/Acre)	67.06	23.47	43.86	129.19	641.80	895.54	162.24	-91.50	1011.11	173.39	966.61	315.29	2.00
Variable costs	93.28	22.69	9.52	87.09	514.36	734.72	271.22	50.86	1608.33	177.95	846.66	500.76	2.44
($/Acre)	116.86	25.17	60.61	80.43	766.21	954.64	93.48	-94.94	900.00	166.08	897.79	202.17	1.44
Total Costs	106.67	22.03	10.27	72.20	551.83	721.66	211.90	42.07	1163.89	153.36	665.52	317.66	2.22
($/Acre)	102.86	25.42	56.42	91.36	756.86	980.83	112.41	-111.56	1155.56	161.93	991.34	347.10	1.56
Gross Margin	87.28	20.43	46.54	79.78	698.58	884.56	-1.35	-187.33	677.78	180.45	851.33	192.50	1.17
($/Acre)	114.83	26.12	11.58	91.38	566.10	788.62	337.22	114.70	1366.33	171.63	911.88	436.24	2.83
Return to Equity	71.58	20.25	40.62	96.00	660.16	895.31	30.60	-204.55	1177.78	191.89	1021.36	359.63	1.17
($/Acre)	121.78	26.38	14.24	84.30	587.58	785.97	324.75	126.36	1227.44	167.21	790.35	379.99	2.89
Land Investment	59.17	22.61	31.37	94.76	689.83	872.17	86.22	-96.12	0.00	187.33	830.85	27.03	1.72
($/Acre)	99.36	23.98	27.28	102.40	627.03	867.46	194.27	-46.16	2161.11	171.70	790.25	609.24	1.94
Buildings Investment	81.22	22.44	26.09	73.39	679.10	856.07	92.37	-84.60	866.67	78.46	771.98	285.08	1.67
($/Acre)	100.06	23.70	42.09	91.63	630.52	841.10	181.40	-29.17	1088.56	268.28	809.52	339.38	1.94
Machine Investment	107.89	24.08	23.23	90.61	619.29	790.35	210.93	39.86	1197.22	185.39	516.30	279.77	2.06
($/Acre)	90.36	22.61	37.51	101.94	645.82	902.73	128.90	-128.01	1172.22	144.36	1235.97	356.17	1.94
Irrigation Investment	55.50	21.85	31.09	90.33	687.47	864.11	62.97	-113.67	66.67	178.52	859.07	0.00	1.67
($/Acre)	93.61	24.16	19.30	79.89	597.17	835.86	235.61	-3.08	1702.78	154.69	932.74	722.42	2.17
Overall Management*	85.58	20.82	47.66	88.76	705.70	907.11	6.52	-194.89	938.89	170.23	884.99	225.78	1.00
($/Acre)	116.50	26.23	10.16	89.07	577.89	782.38	327.91	123.42	1149.67	173.55	818.64	355.82	3.00
Weighted Average ($/Ac.)	84.87	20.11	47.28	90.11	627.46	817.71	371.33	181.09	754.66	131.23	793.63	206.26	2.00

* Overall Management Factor includes Variable Costs, Return to Equity, Yield and Gross Margin

SECTION VI

COMPARISON OF COSTS AND RETURNS, 1990-1998

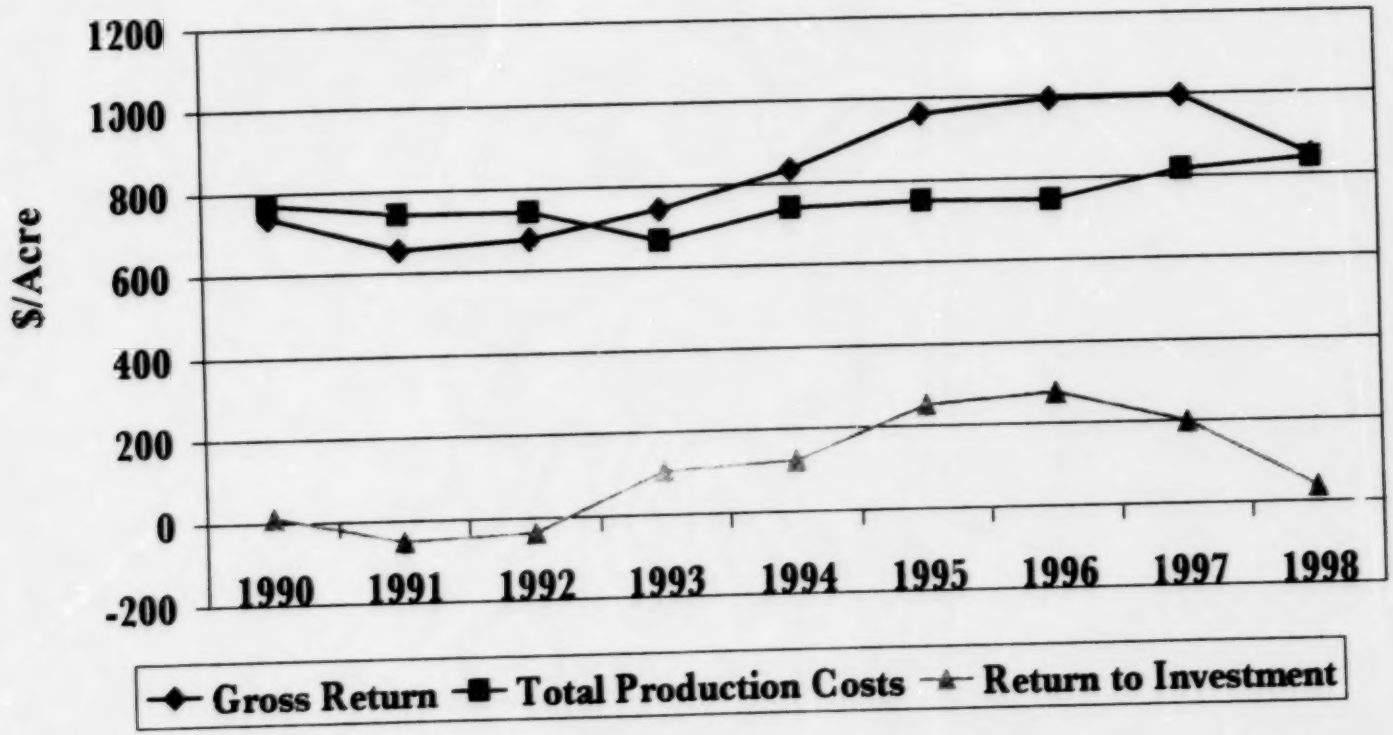
Table 9 presents a nine year (1990 to 1998) comparison of costs and returns for sugar beet production in Alberta. Gross returns ranged from $658 per acre in 1991 to $998 per acre in 1997. Whereas total production costs during the last nine years ranged from $666 in 1993 to $841 per acre in 1998. In 1997 these costs were estimated at $818 per acre, about nine (9) percent higher than in 1996. During the last nine years, net returns to capital were the highest in 1996 at $462 per acre. Returns to unpaid labour ranged from $22 per acre in 1991 to $317 per acre in 1996. In 1997, returns on investment and equity were positive by $201 and $180 per acre, respectively (Table 9).

For the 1998 sugar beet crop, gross returns decreased considerably from 1997, primarily due to 30 percent decline in the price of beets. However, record yields in 1998 helped to avoid a drastic decrease in overall gross revenue. Gross revenue for the 31 sugar beet producers decreased by 15 per cent when compared with 1997 study. Overall production costs increased by about three (3) percent over the costs in 1997. Net returns to capital, unpaid labour, investment and equity have also varied considerably during the last nine years, i.e. from 1990 to 1998. Net returns to capital, unpaid labour, investment and equity for the 1998 crop were significantly lower than the 1997 crop. Drop in net returns is the result of lower price received for beets. Figure 3 shows trends for the last nine years studies (1990 to 1998) of sugar beet producers for gross returns, total production costs and return to investment.

Table 9
Comparison of Costs and Returns, 1990 to 1998

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
A. Gross Returns	740	658	676	744	835	964	995	998	848
B. Variable Costs	553	546	549	478	538	539	533	605	616
C. Direct Cash Costs	442	438	439	400	465	464	464	515	538
D. Capital Costs	218	197	196	188	203	210	214	212	224
E. Total Production Costs	771	743	745	666	741	750	748	818	841
F. Net Returns to:									
Capital	187	112	127	266	297	424	462	392	232
Unpaid Labour	80	22	41	155	166	289	317	270	85
Investment	14	(49)	(36)	106	123	253	278	201	36
Equity	(31)	(89)	(69)	78	94	214	248	180	8

Figure 3
Comparison of Costs/Returns, 1990-1998



SECTION VII

SUMMARY

A summary of the 1998 sugar beets production costs and returns is presented in Table 10. As mentioned earlier, the sample size of 31 sugar beet producers (53 fields) was divided into two groups, i.e., beets produced on owned (31) and rented land (22).

Average gross returns (crop sales, miscellaneous receipts and government program payments) for the entire study sample amounted to $848 per acre ($34.39 per tonne) for the 1998 sugar beets crop. For beets produced on owned and rented land, gross returns were $870 per acre ($34.46 per tonne) and $812 per acre ($34.26 per tonne), respectively.

Average seed, fertilizer and chemical costs for sugar beet production were estimated at $202 per acre ($8.17 per tonne) for the study sample. These costs were $207 per acre ($8.19 per tonne) for beets grown on owned land compared to $198 per acre ($8.37 per tonne) for rented land. Miscellaneous costs (hail/crop insurance, utilities, other insurance, association fees and research levies) amounted to $60 per acre ($2.44 per tonne) for the study sample; $66 per acre ($2.60 per tonne) for beets produced on owned land and $51 per acre ($2.15 per tonne) on rented land. Average cost for custom work/specialized labour and custom trucking amounted to $109 per acre ($4.44 per tonne) for the study sample, $109 per acre ($4.31 per tonne) for the owned land and $111 per acre ($4.67 per tonne) the rented land groups.

Average operating interest paid per acre was $8.24 per acre ($0.33 per tonne), $7.93 per acre ($0.31 per tonne), and $8.75 per acre ($0.37 per tonne) for the study sample, owned land and rented land groups, respectively. Average labour cost (paid and unpaid) was $117 per acre ($4.72 per tonne) for the study sample. It was $113 per acre ($4.47 per tonne) for beets grown on owned land and $123 per acre ($5.21 per tonne) for rented land.

Table 10: Summary of Sugar Beet Costs and Returns, 1998						
	Study Sample		Owned Land		Rented Land	
Acres Cropped	97.71		105.37		86.91	
Yield Per Acre (tonnes)	24.67		25.24		23.69	
	$/acre	$/tonne	$/acre	$/tonne	$/acre	$/tonne
A. **GROSS RETURNS**	848.29	34.39	869.82	34.46	811.52	34.26
VARIABLE COSTS						
Seed, Fertilizer & Chemicals	201.78	8.18	206.75	8.19	198.24	8.37
Miscellaneous*	60.24	2.44	65.72	2.60	50.85	2.15
Fuel and Repairs (Mach & Bldg)	118.09	4.79	110.58	4.38	130.94	5.53
Custom Trucking	78.34	3.18	80.49	3.19	74.67	3.15
Custom Work & Specialized Labour	31.14	1.26	28.32	1.12	35.95	1.52
Operating Interest	8.24	0.33	7.93	0.31	8.75	0.37
Labour (Paid & Unpaid)	116.54	4.72	112.73	4.47	123.37	5.21
B. **TOTAL VARIABLE COSTS**	616.19	24.69	612.31	24.26	622.77	26.29
C. **CASH COSTS** (B - Unpaid Labour)	538.45	21.57	532.05	21.08	549.34	23.19
D. **CAPITAL COSTS**	224.35	9.05	213.23	8.45	243.37	10.27
E. **TOTAL PRODUCTION COSTS** (B+D)	840.54	33.74	825.54	32.71	866.14	36.57
F. **NET RETURNS**						
Return to Capital (Contribution Margin)	232.10	9.70	257.51	10.20	188.75	7.97
Return to Unpaid Labour	85.49	3.77	124.54	4.93	18.81	0.79
Return to Investment	36.32	1.64	82.92	3.29	(43.21)	(1.82)
Return to Equity	7.75	0.65	44.28	1.75	(54.62)	(2.31)

* Miscellaneous costs include; hail/crop insurance, utilities, other insurance, Board fees and research levies.

Average total variable cost for the 1998 sugar beet crop was estimated at $616 per acre ($24.69 per tonne) for the study sample; $612 per acre ($24.26 per tonne) for the owned land group and $623 per acre ($26.29 per tonne) for beets produced on rented land. Average direct cash costs (total variable costs less unpaid labour) amounted to $538 ($21.57 per tonne); $532 ($21.08 per tonne); and $549 per acre ($23.19 per tonne) for the study sample; owned group and rented land group, respectively. Details of returns and various costs for the three groups are presented in Table 10 above.

Average capital costs were estimated at $224 per acre ($9.05 per tonne) for all of the study participants. These were $213 per acre ($8.45 per tonne) for the group who produced beets on owned land compared with $243 per acre ($10.27 per tonne) for beets grown on rented land.

Average total production costs for the 1998 sugar beet crop (variable costs + capital costs) amounted to $841 per acre ($33.74 per tonne) for the study sample. For beets grown on owned land, average production costs were estimated at $826 per acre ($32.71 per tonne), compared to $866 per acre ($36.57 per tonne) for beets grown on rented land (Table 10).

Average return to capital (gross margin) and unpaid labour for the 1998 sugar beet crop was $232 per acre ($9.41 per tonne) and $85 per acre ($3.47 per tonne) for the study sample, respectively. Returns to investment and equity for the study sample were positive at $36 per acre ($1.47 per tonne) and $8 per acre ($0.31 per tonne), respectively, for the 53 sugar beet fields surveyed for the 1998 study. Average return to capital for beets grown on owned land was $258 per acre ($10.20 per tonne) and $189 per acre ($7.97 per tonne) for beets grown on rented land. Return to unpaid labour for beets produced on owned land was at $125 per acre ($4.93 per tonne) compared with a return of $19 per acre ($0.79 per tonne) for beets produced on rented land. Returns to investment and equity for the study sample and beets grown on owned land were positive for the 1998 sugar beets crop. However, these returns were negative for beets grown on rented land. Details on gross returns, major costs and net returns are presented in Table 10.